

WHAT IS CLAIMED IS:

1. An actuator for actuating at least two driven shafts arranged in parallel with each other in axial directions thereof, through cams held on the driven shafts for
5 driving the driven shafts respectively, so that each driven shaft is selectively moved in the axial direction thereof by a predetermined stroke by driving each cam to a predetermined stopping position in accordance with a mode changed over from another mode among a plurality
10 of modes to be switched, the actuator comprising:

a motor;

a driving gear meshed with a worm formed on a shaft of the motor;

an output shaft connected to the driving gear;

15 a pair of cam followers turning by a rotation of the output shaft, and engaged with the cams so as to drive the cams;

a plurality of urging members respectively held in a plurality of urging member housings formed at
20 predetermined intervals along a circle on a side face of the driving gear;

a rotation retaining plate fixed on the output shaft so as not to rotate relative to the output shaft;

a plurality of pressing parts each of which projects
25 from the rotation retaining plate, and each of which is

capable of pressing one of both end portions of the corresponding urging member;

slits formed on the driving gear between adjacent ones of the urging member housings so as to prevent the pressing parts from interfering with the driving gear;

a first actuator case in which the driving gear, the rotation retaining plate and the output shaft are housed; and

a second actuator case fixed to the first actuator case, supporting each driven shaft so that the driven shafts are moved freely in the axial direction thereof and housing each of the cams therein,

wherein a rotation of the driving gear is transmitted to the output shaft via the urging members and the rotation retaining plate, either one of both end portions of each of the urging members being pressed by the corresponding pressing part of the rotation retaining plate when the rotation of the driving gear is continued after the output shaft is locked and stopped in an intermediate position of the rotation thereof.

2. An actuator according to Claim 1, wherein the urging member housings formed on the driving gear are three arcuate urging member housings arranged at regular intervals in the circumferential direction thereof, the

urging members being three cylindrical compression springs.

3. An actuator for actuating a two-wheel drive and
5 four-wheel drive change-over apparatus having a first
change-over shaft for switching two-wheel
drive/four-wheel drive and a second change-over shaft
for changing speeds of four wheels, the first and second
change-over shaft being arranged in parallel with each
10 other in a transfer and movable in axial directions
thereof by cams held on the first and second change-over
shafts for driving the first and second change-over
shafts respectively, wherein the actuator is adapted to
switch selectively from one to another of four driving
15 conditions including two-wheel drive, four-wheel
high-speed drive, four-wheel neutral and four-wheel
low-speed driving condition by driving the cams in the
change-over apparatus to predetermined stopping
positions respectively in accordance with a mode changed
20 by a shifting operation of a mode change-over switch,
and thereby moving the change-over shafts selectively
in the axial directions at predetermined strokes, the
actuator including:

a motor;

25 a driving gear meshed with a worm formed on a shaft

of the motor;

an output shaft connected to the driving gear;

a pair of cam followers turning by a rotation of the output shaft, and engaged with the cams so as to drive

5 the cams;

a plurality of urging members respectively held in a plurality of urging member housings formed at predetermined intervals along a circle on a side face of the driving gear;

10 a rotation retaining plate fixed on the output shaft so as not to rotate relative to the output shaft;

a plurality of pressing parts each of which projects from the rotation retaining plate, and each of which is capable of pressing either one of both end portions of
15 a corresponding urging member;

slits formed on the driving gear between adjacent ones of the urging member housings so as to prevent the pressing parts from interfering with the driving gear;

a first actuator case in which the driving gear,
20 the rotation retaining plate and the output shaft are housed; and

a second actuator case fixed to the first actuator case, supporting each driven shaft so that the driven shafts are moved freely in the axial direction thereof
25 and housing each of the cams therein,

wherein a rotation of the driving gear is transmitted to the output shaft via the urging members and the rotation retaining plate, either one of both end portions of each of the urging members being pressed by
5 the corresponding pressing part of the rotation retaining plate when the rotation of the driving gear is continued after the output shaft is locked and stopped in an intermediate position of the rotation thereof.

10 4. An actuator for driving a two-wheel drive and four-wheel drive change-over apparatus according to Claim 3,

wherein the urging member housings formed on the driving gear are three arcuate urging member housings
15 formed on the driving gear at regular intervals in the circumferential direction thereof, the urging members being three cylindrical compression springs.

5. A two-wheel drive and four-wheel drive change-over
20 apparatus having a first change-over shaft for switching two-wheel drive/four-wheel drive and a second change-over shaft for changing speeds of four wheels, the first and second change-over shafts being arranged in parallel with each other in a transfer and movable
25 in axial directions thereof, cams held on the first and

second change-over shafts for driving the first and the second change-over shafts respectively, and an actuator adapted to be driven rotationally to predetermined stopping positions respectively in accordance with a mode
5 changed by a switching operation of a mode change-over switch, and drive each cam and thereby move the change-over shafts selectively in the axial directions thereof at predetermined strokes, the actuator including:

10 a motor;

a driving gear meshed with a worm formed on a shaft of the motor;

an output shaft connected to the driving gear;

a pair of cam followers turning by a rotation of
15 the output shaft, and engaged with the cams so as to drive the cams;

a plurality of urging members respectively held in a plurality of urging member housings formed at predetermined intervals along a circle on a side face
20 of the driving gear;

a rotation retaining plate fixed on the output shaft so as not to rotate relative to the output shaft;

a plurality of pressing parts each of which projects from the rotation retaining plate, and each of which is
25 capable of pressing either one of both end portions of

a corresponding urging member;

slits formed on the driving gear between adjacent ones of the urging member housings so as to prevent the pressing parts from interfering with the driving gear;

5 a first actuator case in which the driving gear, the rotation retaining plate and the output shaft are housed; and

a second actuator case fixed to the first actuator case, supporting each driven shaft so that the driven
10 shafts are moved freely in the axial direction thereof and housing each of the cams therein,

wherein a rotation of the driving gear is transmitted to the output shaft via the urging members and the rotation retaining plate, either one of both end
15 portions of each of the urging members being pressed by the corresponding pressing part of the rotation retaining plate when the rotation of the driving gear is continued after the output shaft is locked and stopped in an intermediate position of the rotation thereof.

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6. A two-wheel drive and four-wheel drive change-over apparatus according to Claim 5, wherein the plural urging member housings formed on the driving gear are three arcuate urging member housings formed at predetermined
25 intervals along a circle which is the same as an outer

circumference of the driving gear, the urging members being three cylindrical compression springs.